

# WEEKLY CLIMATE BULLETIN

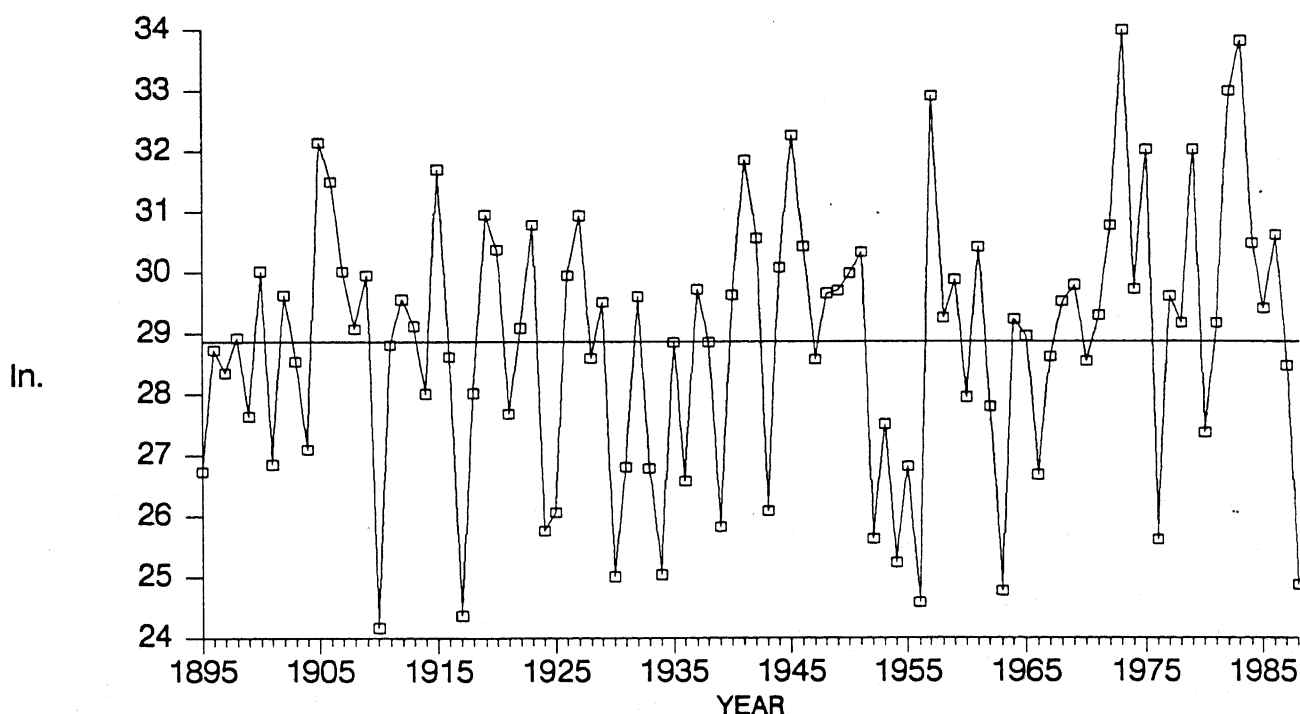
No. 89/02

Washington, DC

January 14, 1989

## NATIONAL PRECIPITATION

ANNUAL, 1895-1988



National Climatic Data Center, NOAA

*PRELIMINARY PRECIPITATION DATA FROM THE NATIONAL CLIMATIC DATA CENTER (NCDC) HAS RANKED 1988 AS THE FIFTH DRIEST YEAR DURING THE PAST 94 YEARS (SINCE 1895) FOR THE UNITED STATES. FOR FURTHER DETAILS, REFER TO THE 1988 ANNUAL CLIMATE REVIEW STARTING ON PAGE 11.*

**UNITED STATES DEPARTMENT OF COMMERCE**

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

## WEEKLY CLIMATE BULLETIN

|                   |   |
|-------------------|---|
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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief; concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major global climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every 3 months).
- Global temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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# GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 14, 1989

[Approximate duration of anomalies is in brackets]

1. Alaska and Northwestern Canada:

**ABNORMALLY MILD WEATHER DIMINISHES.**

Temperatures approached 6.2°C (11.2°F) below normal as mild conditions ended in northwestern Alaska; however, to the south and east temperatures were still up to 7.4°C (13.3°F) above normal [5 weeks].

2. Southwestern United States:

**AREA UNUSUALLY COLD.**

Temperatures were as much as 7.2°C (13.0°F) below normal in the Southwest [4 weeks], while the Los Angeles area experienced high winds [Episodic Event].

3. Uruguay and Northern Argentina:

**VERY WARM AND DRY.**

Little or no precipitation fell in the region during the past week [29 weeks]. The very dry conditions were aggravated by temperatures up to 4.1°C (7.4°F) above normal [8 weeks].

4. Italy:

**DRYNESS DEVELOPS.**

Little or no precipitation fell in northern and central Italy as a dry spell developed [8 weeks].

5. Greece, Turkey, and the Middle East:

**COLD SPELL CONTINUES.**

Cold weather prevailed across much of the eastern Mediterranean, with temperatures as much as 5.9°C (10.6°F) below normal [5 weeks].

6. South Central Siberia:

**MILD CONDITIONS LINGER.**

The mild weather regime, with temperatures reaching 13.1°C (23.6°F) above normal, persisted in the region northeast of Lake Baykal [14 weeks].

7. Northwestern India:

**UNUSUALLY COLD WEATHER OCCURS.**

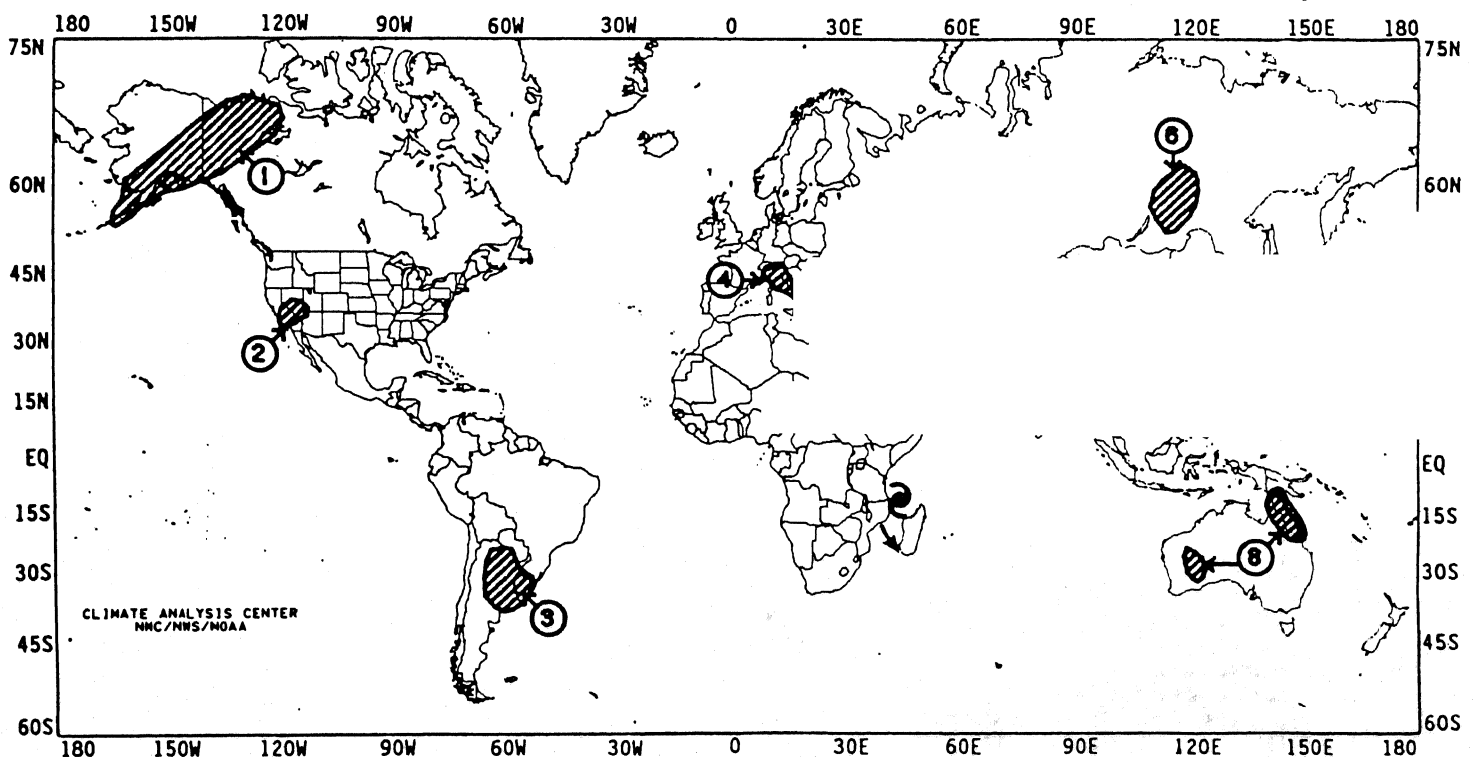
Temperatures reached 6.0°C (10.8°F) below normal as abnormally cold conditions prevailed [Episodic Event].

8. Australia:

**WET SPELL ENDS.**

Most areas of Australia had less than 36.0 mm (1.42 inches) of precipitation as drier weather conditions returned [Ended at 10 weeks].

(NOTE: Text precipitation amounts and temperature departures are this week's values).



Approximate locations of the major anomalies and events described above are shown on this map. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, longer term anomalies, and other details.

# UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JANUARY 8 THROUGH JANUARY 14, 1989.

A Pacific storm system brought widespread precipitation to the Pacific Northwest as rains fell along the coast and snows blanketed portions of the Cascades. Farther east, much of the lower Mississippi and Tennessee Valleys received excessive rainfall from two weather systems. Early in the week, a slow-moving cold front produced heavy showers and thunderstorms from eastern Texas northeastward to Indiana that spawned tornadoes in Illinois, Kentucky, and Indiana. Later in the week, a low pressure center formed in the western Gulf of Mexico and tracked northeastward, triggering torrential showers and thunderstorms in Louisiana, Mississippi, Alabama, Tennessee, and Kentucky. Meanwhile, up to 8 inches of snow covered portions of Oklahoma and Missouri, while sleet, freezing rain, and snow glazed sections of the Ohio Valley, mid-Atlantic, and New England. High winds hit parts of the northern Rockies, southern California, and the eastern slopes of the central Rockies as gusts up to 115 mph were reported at Boulder, CO.

For the fourth consecutive week, moderate or heavy precipitation was measured in the lower Mississippi and Tennessee Valleys, alleviating or greatly diminishing long-term precipitation deficits accumulated during last year's drought. According to the River Forecast Centers, up to 9.6 inches of precipitation were recorded in northern Alabama, while an extensive area of the South observed more than 5 inches (see Figure 1). Some flooding occurred in the region after several weeks of above normal precipitation had saturated the ground. In the West, between 2 and 5 inches of rain was reported along the Pacific Northwest Coast while heavy snows fell on parts of the Cascades and northern Rockies. Locally heavy snows buried

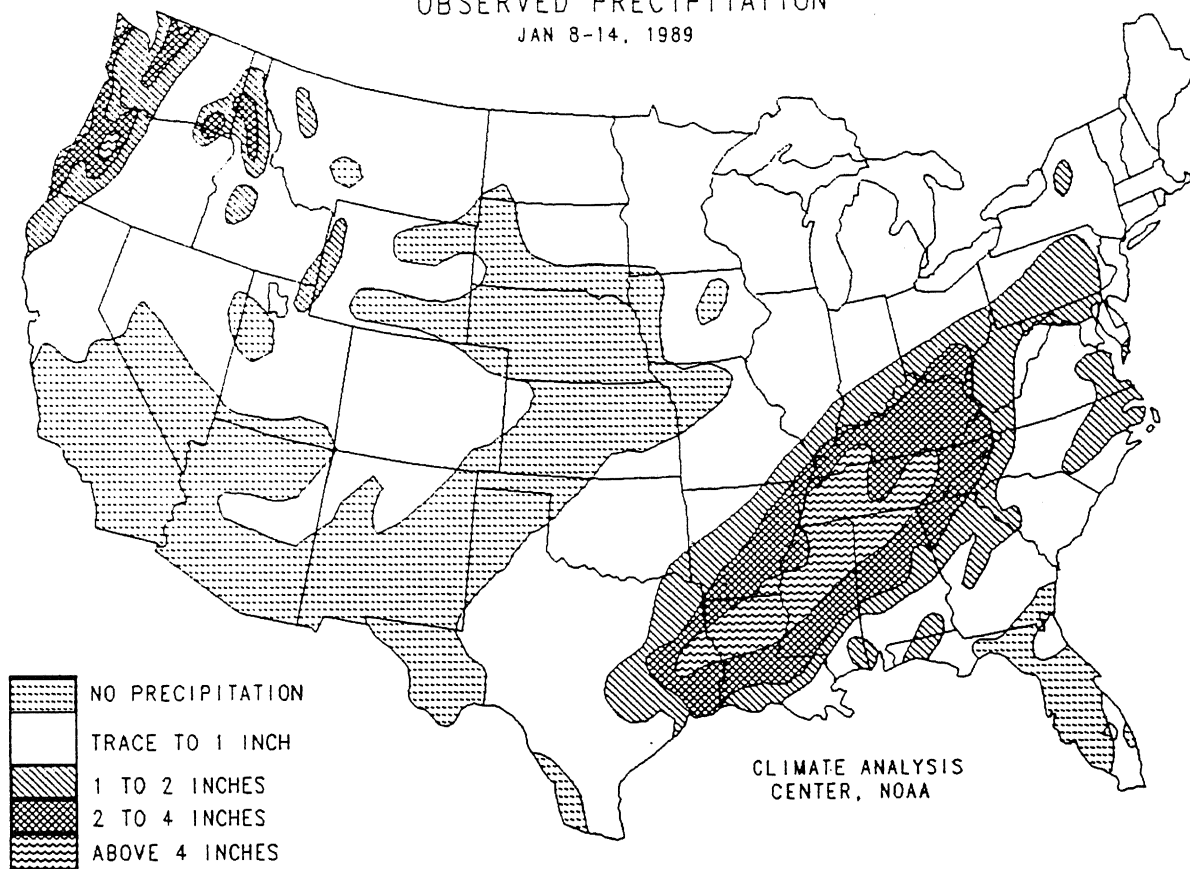
portions of the Great Lakes snowbelt. Copious rains (nearly a foot at Hilo) soaked areas of Hawaii (see Table 1). Light to moderate amounts were recorded along the northern two-thirds of the Pacific Coast, in the northern half of the Intermountain West, the northern and central Rockies, the northern and southern Great Plains, and in most of the country east of the Mississippi River. Little or no precipitation fell on the Southwest, most of Florida, and the central Great Plains as the latter area has experienced extremely dry weather during the past three months.

This week's temperatures were similar to last week's as abnormally cold conditions prevailed in the Southwest and unseasonably mild air remained in the eastern half of the nation. The persistent presence of an upper-air trough anchored over the Rockies brought mild southwesterly flow to the eastern U.S. The warmth was most notable along the eastern Gulf Coast and in Florida as temperatures averaged between 7° and 13°F above normal (see Table 2) and highs surpassed 80°F (see Figure 2). In Alaska, temperatures moderated from the previous week but were still as much as 13°F above normal. In sharp contrast, below normal temperatures occurred in the West, the northern Great Plains, and the upper Midwest. The greatest negative temperature departures (up to -13°F) were found in the Great Basin, central Rockies, and northern Great Plains (see Table 3). Bitterly cold arctic air, clear skies, and deep snow cover sent readings plummeting below -30°F (-45°F at Roseau, MN) in portions of Montana, North Dakota, and Minnesota (see Figure 3). Subnormal temperatures invaded northern and western Alaska after several weeks of unseasonably mild conditions.

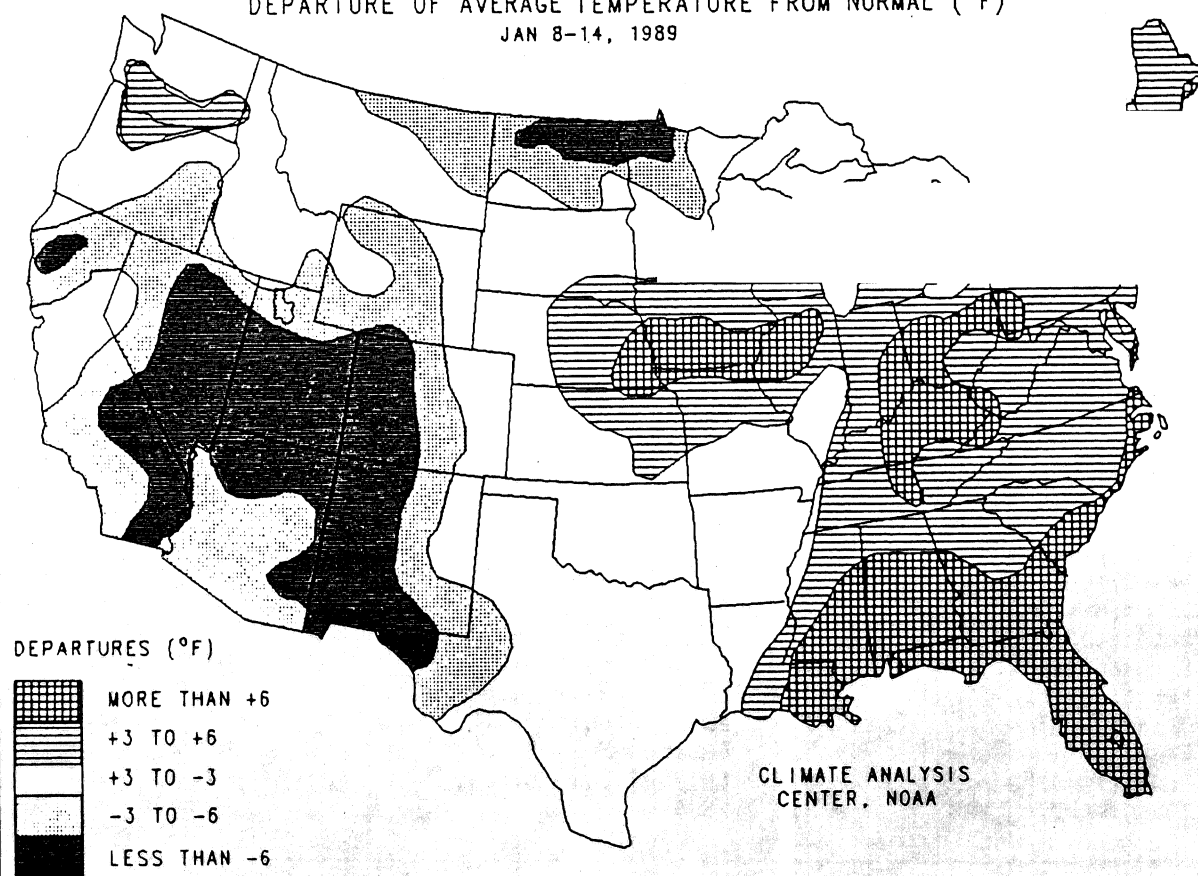
TABLE 1. Selected stations with more than three inches of precipitation for the week.

| Station                       | Amount(In) | Station                    | Amount(In) |
|-------------------------------|------------|----------------------------|------------|
| Hilo/Lyman, Hawaii, HI        | 11.82      | Eugene, OR                 | 3.93       |
| Kokee, Kauai, HI              | 9.84       | Alexandria/England AFB, LA | 3.77       |
| Columbus AFB, MS              | 6.94       | Birmingham, AL             | 3.64       |
| Lihue, Kauai, HI              | 5.98       | Memphis NAS, TN            | 3.61       |
| Muscle Shoals, AL             | 5.79       | Bowling Green, KY          | 3.56       |
| Jackson, TN                   | 5.37       | Jackson, MS                | 3.50       |
| Crossville, TN                | 5.30       | Yakutat, AK                | 3.50       |
| Huntsville, AL                | 5.24       | Knoxville, TN              | 3.46       |
| Quillayute, WA                | 5.22       | Greenwood, MS              | 3.42       |
| Monroe, LA                    | 5.00       | Blytheville AFB, AR        | 3.35       |
| North Bend, OR                | 4.93       | Shreveport, LA             | 3.34       |
| Lufkin, TX                    | 4.53       | Meridian NAS, MS           | 3.34       |
| Shreveport/Barksdale AFB, LA  | 4.38       | Astoria, OR                | 3.32       |
| Hopkinsville/Campbell AAF, TN | 4.37       | Nashville, TN              | 3.15       |
| Memphis, TN                   | 4.21       | Tuscaloosa, AL             | 3.09       |
| Chattanooga, TN               | 4.15       |                            |            |

# OBSERVED PRECIPITATION JAN 8-14, 1989



# DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F) JAN 8-14, 1989



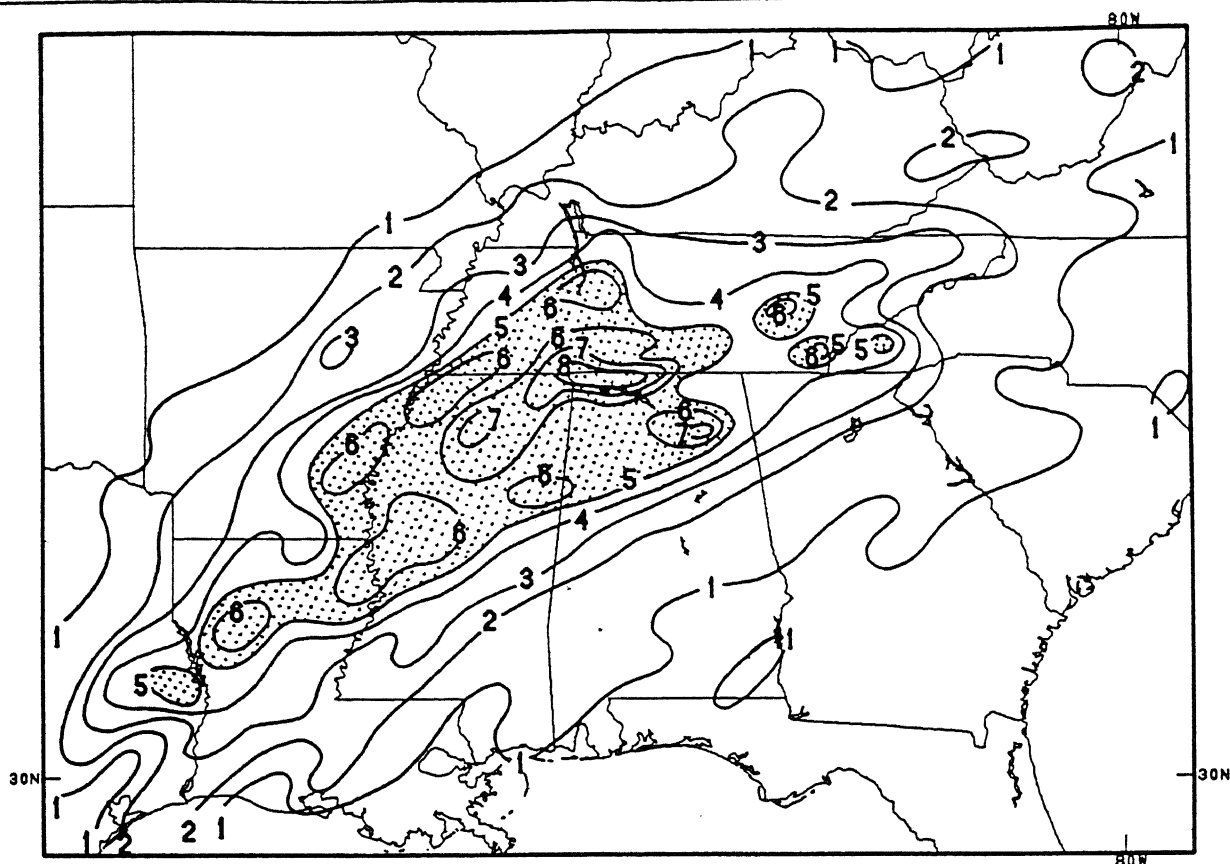
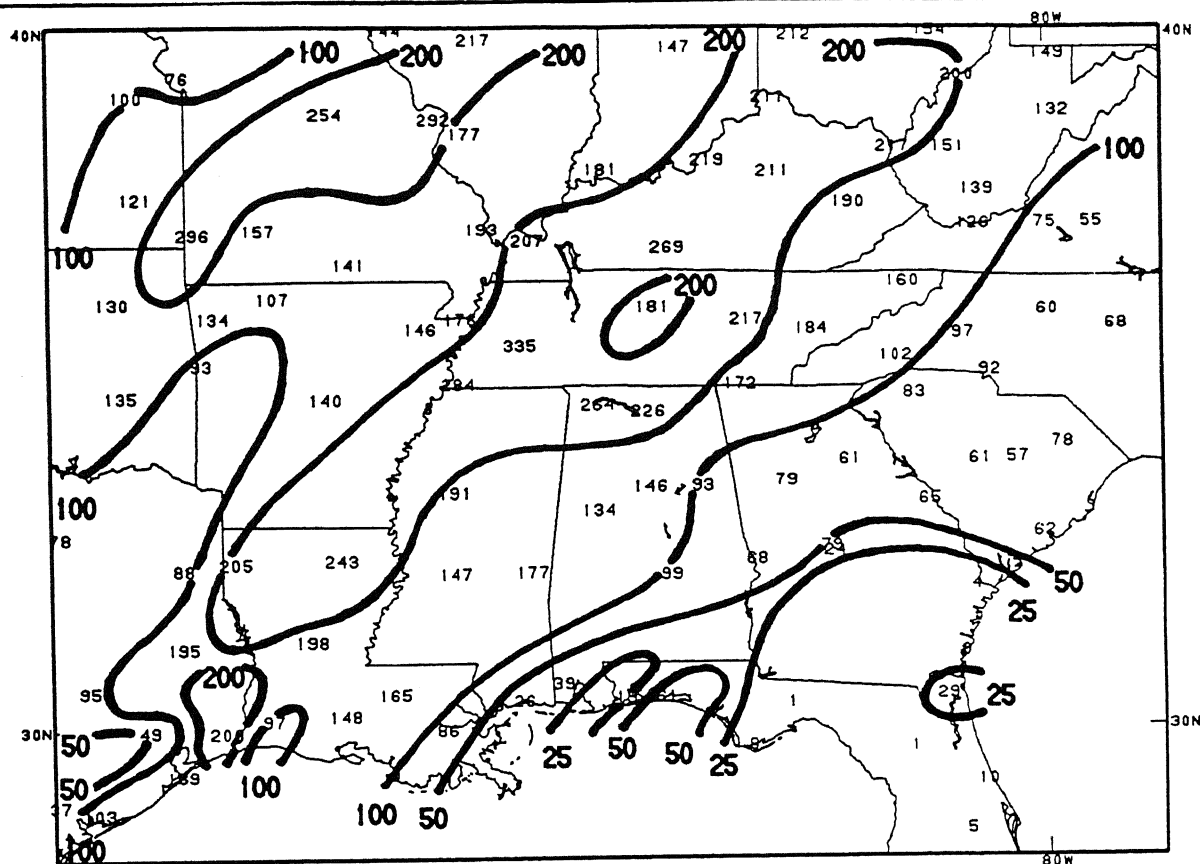


Figure 1. Total precipitation (inches) during Jan. 8-14, 1989 based upon the River Forecast Centers network. Torrential rains fell on the lower Mississippi and Tennessee Valleys and caused some flooding as above normal precipitation has occurred in the area during the past four weeks.

TABLE 2. Selected stations with temperatures averaging 7.0°F or more ABOVE normal for the week.

| Station                  | TDepNm] | AvgT(°F) | Station               | TDepNm] | AvgT(°F) |
|--------------------------|---------|----------|-----------------------|---------|----------|
| Fairbanks, AK            | +13.2   | 0.4      | Columbus, GA          | +8.6    | 54.6     |
| Tallahassee, FL          | +13.0   | 64.4     | Savannah, GA          | +8.4    | 57.4     |
| Apalachicola, FL         | +11.8   | 64.6     | Tuscaloosa, AL        | +8.2    | 51.8     |
| Gulkana, AK              | +11.8   | 2.1      | Lincoln, NE           | +8.1    | 27.4     |
| Tampa, FL                | +11.6   | 71.4     | Charleston, SC        | +8.0    | 55.7     |
| Northway, AK             | +11.3   | -11.2    | Vero Beach, FL        | +7.8    | 69.7     |
| Biloxi/Keesler AFB, MS   | +11.2   | 64.1     | Rome/Griffiss AFB, NY | +7.8    | 28.6     |
| Orlando, FL              | +11.1   | 71.1     | Morgantown, WV        | +7.6    | 37.3     |
| Daytona Beach, FL        | +10.8   | 68.7     | Lebanon, NH           | +7.6    | 24.8     |
| Valparaiso/Eglin AFB, FL | +10.7   | 62.7     | West Palm Beach, FL   | +7.5    | 73.1     |
| Pensacola, FL            | +10.7   | 62.1     | Baton Rouge, LA       | +7.5    | 58.1     |
| Jacksonville, FL         | +10.3   | 64.2     | Bristol, TN           | +7.5    | 42.4     |
| Cape Hatteras, NC        | +10.2   | 55.5     | Montpelier, VT        | +7.5    | 23.2     |
| New Orleans/Moisant, LA  | +10.1   | 62.5     | Ottumwa, IA           | +7.4    | 27.1     |
| Ft. Myers, FL            | +9.3    | 72.6     | Utica, NY             | +7.2    | 27.4     |
| Mobile, AL               | +9.3    | 59.8     | Glens Falls, NY       | +7.2    | 25.2     |
| Burlington, VT           | +9.1    | 26.0     | Miami, FL             | +7.1    | 74.2     |
| Meridian, MS             | +9.0    | 54.2     | Wilmington, NC        | +7.0    | 52.6     |
| Massena, NY              | +9.0    | 23.8     | Quincy, IL            | +7.0    | 30.2     |
| Gainesville, FL          | +8.8    | 66.4     | Moline, IL            | +7.0    | 26.4     |
| Brunswick, GA            | +8.8    | 59.9     | Des Moines, IA        | +7.0    | 25.3     |
| Montgomery, AL           | +8.8    | 55.4     |                       |         |          |



Percent of normal precipitation during Dec. 18, 1988-Jan. 14, 1989. Much of the South and lower Midwest has recorded above normal precipitation during the past four weeks. In contrast, most of the eastern Gulf and southern Atlantic Coasts have experienced extremely dry weather.

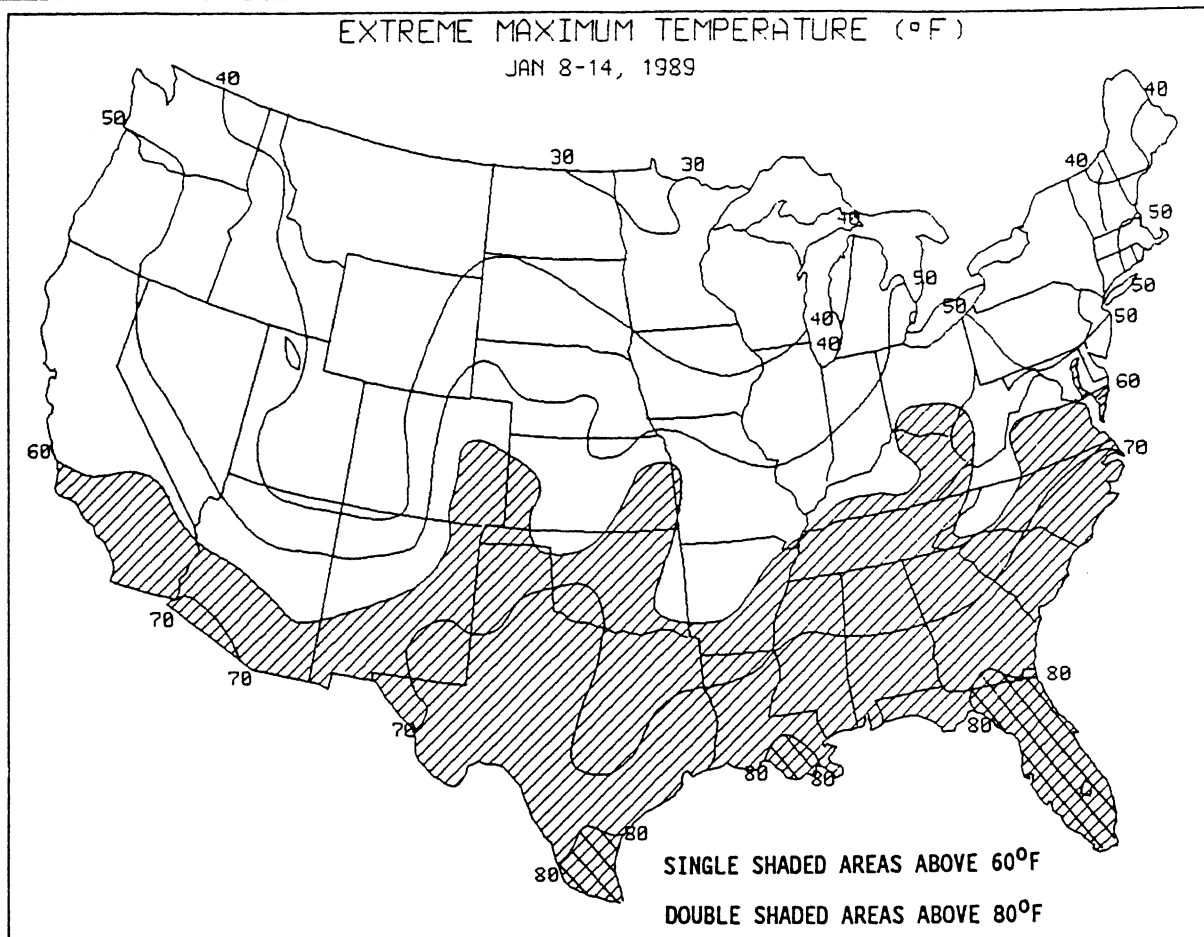
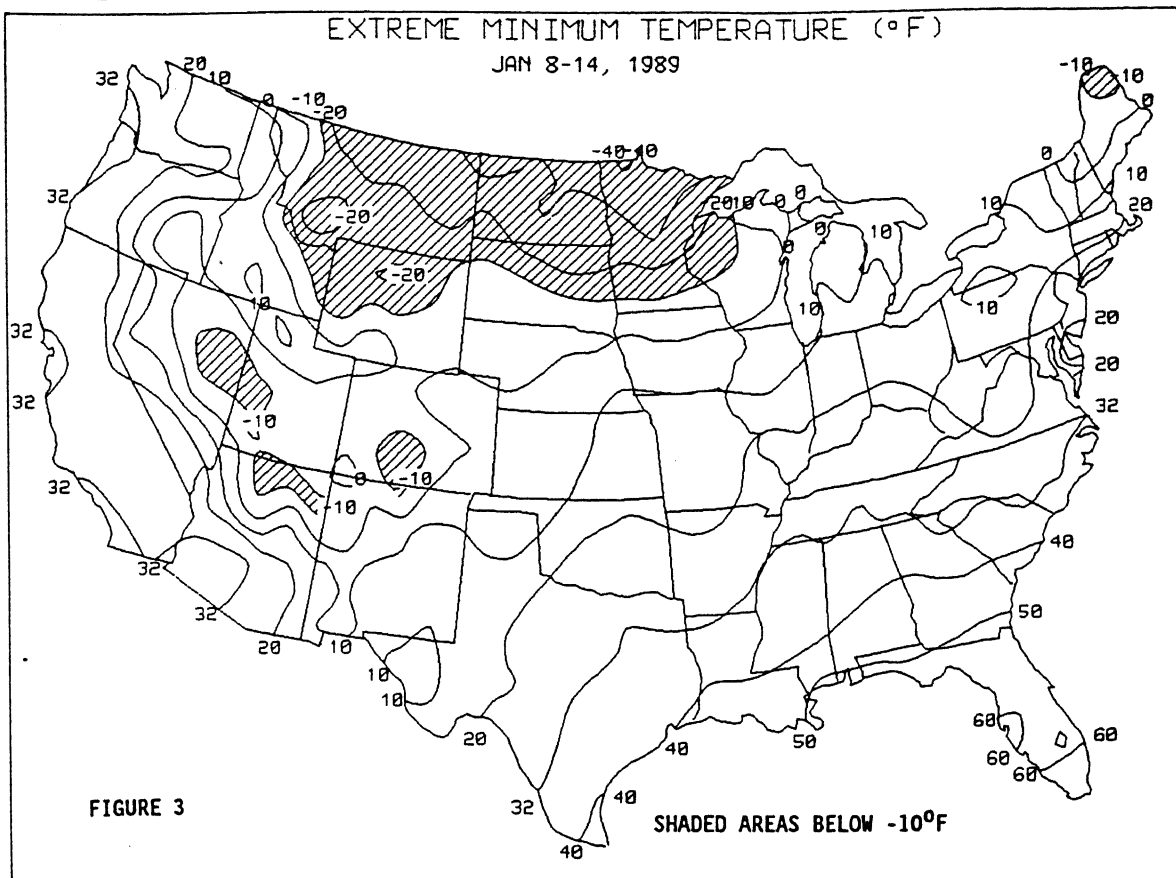


Figure 2. Extreme maximum temperatures (°F) during Jan. 8-14, 1989. Temperatures in Texas "cooled" into the sixties and seventies after hitting the upper eighties and lower nineties last week, but unseasonably warm weather continued throughout Florida and along the South Atlantic Coast with highs in the seventies and eighties.

TABLE 3. Selected stations with temperatures averaging 5.0°F or more BELOW normal for the week.

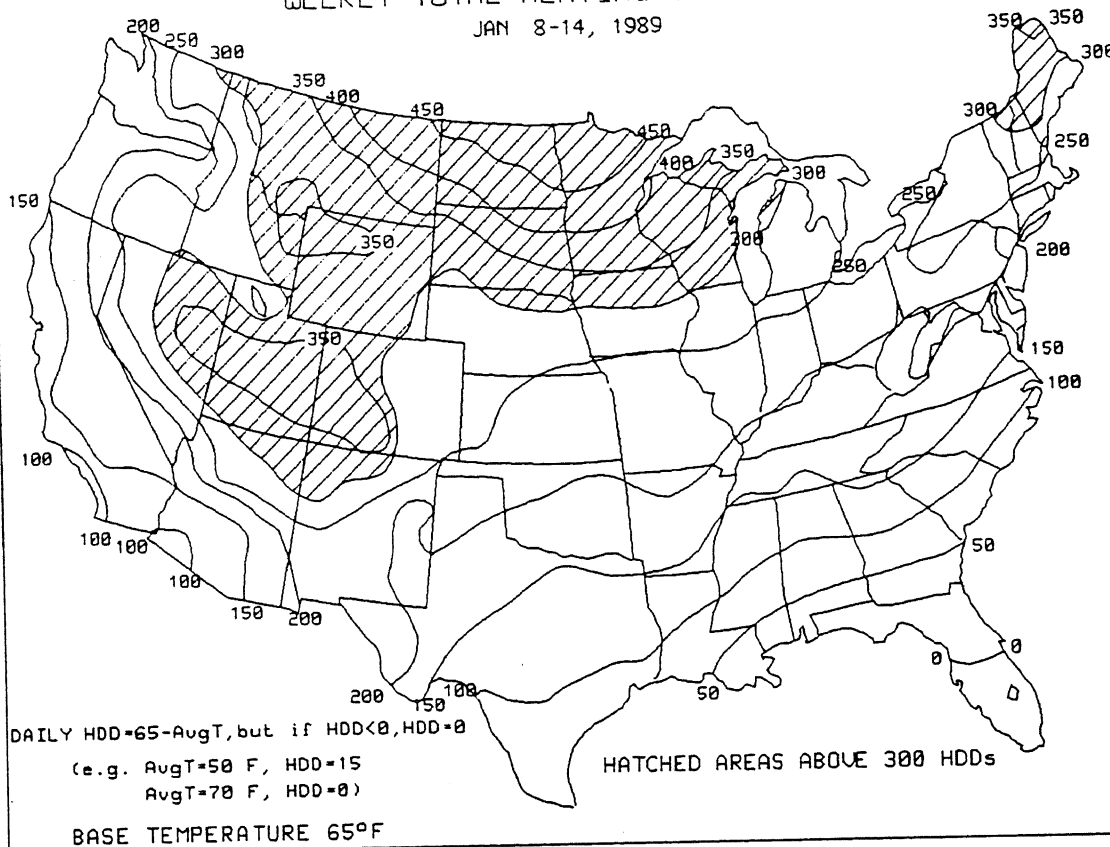
| Station            | TDepNm1 | AvgT(°F) | Station                      | TDepNm1 | AvgT(°F) |
|--------------------|---------|----------|------------------------------|---------|----------|
| Cedar City, UT     | -13.0   | 16.1     | Albuquerque, NM              | -6.3    | 28.2     |
| Delta, UT          | -12.4   | 13.8     | Bakersfield, CA              | -6.2    | 41.4     |
| Nome, AK           | -11.1   | -5.1     | Blythe, CA                   | -6.2    | 46.6     |
| Grand Junction, CO | -11.1   | 13.8     | Daggett, CA                  | -6.1    | 41.6     |
| Ely, NV            | -10.5   | 13.6     | Minot, ND                    | -5.9    | -0.1     |
| Farmington, NM     | -9.3    | 19.7     | Winnemucca, NV               | -5.9    | 23.4     |
| Elko, NV           | -8.7    | 15.6     | Alamosa, CO                  | -5.8    | 9.1      |
| El Paso, TX        | -8.3    | 35.7     | Idaho Falls, ID              | -5.8    | 12.4     |
| Grand Forks, ND    | -7.8    | -6.0     | Thermal, CA                  | -5.7    | 47.9     |
| Kotzebue, AK       | -7.5    | -10.1    | Carlsbad, NM                 | -5.6    | 37.1     |
| Imperial, CA       | -7.5    | 47.5     | Las Vegas, NV                | -5.6    | 38.4     |
| Barrow, AK         | -7.2    | -20.7    | Tucson/Davis-Monthan AFB, AZ | -5.6    | 44.3     |
| Deming, NM         | -7.1    | 33.9     | Kingsville NAS, TX           | -5.6    | 54.7     |
| Tucson, AZ         | -6.8    | 43.9     | Prescott, AZ                 | -5.5    | 30.3     |
| Redding, CA        | -6.5    | 39.4     | Fresno, CA                   | -5.3    | 39.5     |
| Williston, ND      | -6.3    | 0.4      | Havre, MT                    | -5.2    | 6.2      |



The lowest temperatures of this Winter (below -40°F) were recorded in northern Minnesota (-45°F at Roseau, MN and -43°F at Warroad, MN) as frigid arctic air, clear skies, and deep snow cover sent readings plummeting (top). Extremely dangerous wind chills (less than -30°F) were recorded in the northern Great Plains and upper Midwest as wind chills as low as -60°F occurred for the second straight week (bottom).

# WEEKLY TOTAL HEATING DEGREE-DAYS

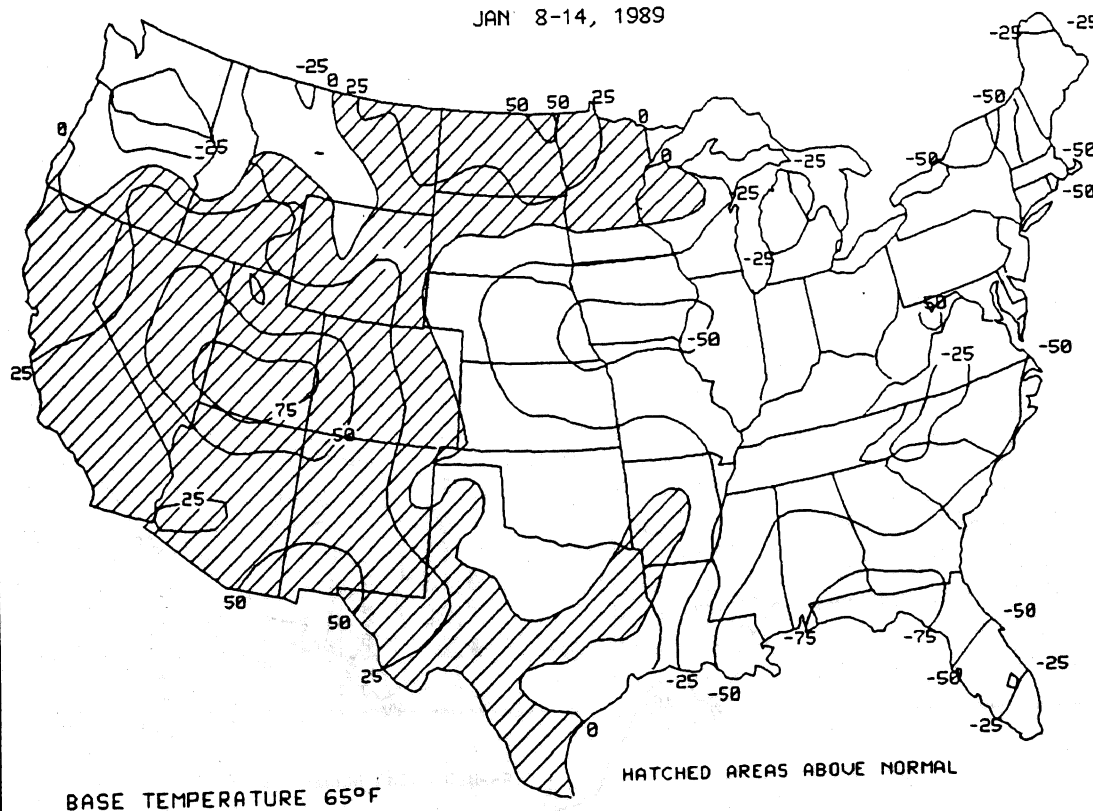
JAN 8-14, 1989



The greatest weekly heating usage (>350 HDD's) was confined to the extreme northern Great Plains, upper Midwest, and Rockies as bitterly cold air and deep snow cover kept temperatures low and total HDD's high (top). In contrast, mild weather in the eastern half of the nation decreased the weekly heating demand by 25-50% in the Midwest and South (bottom).

# WEEKLY DEPARTURE FROM NORMAL HDD

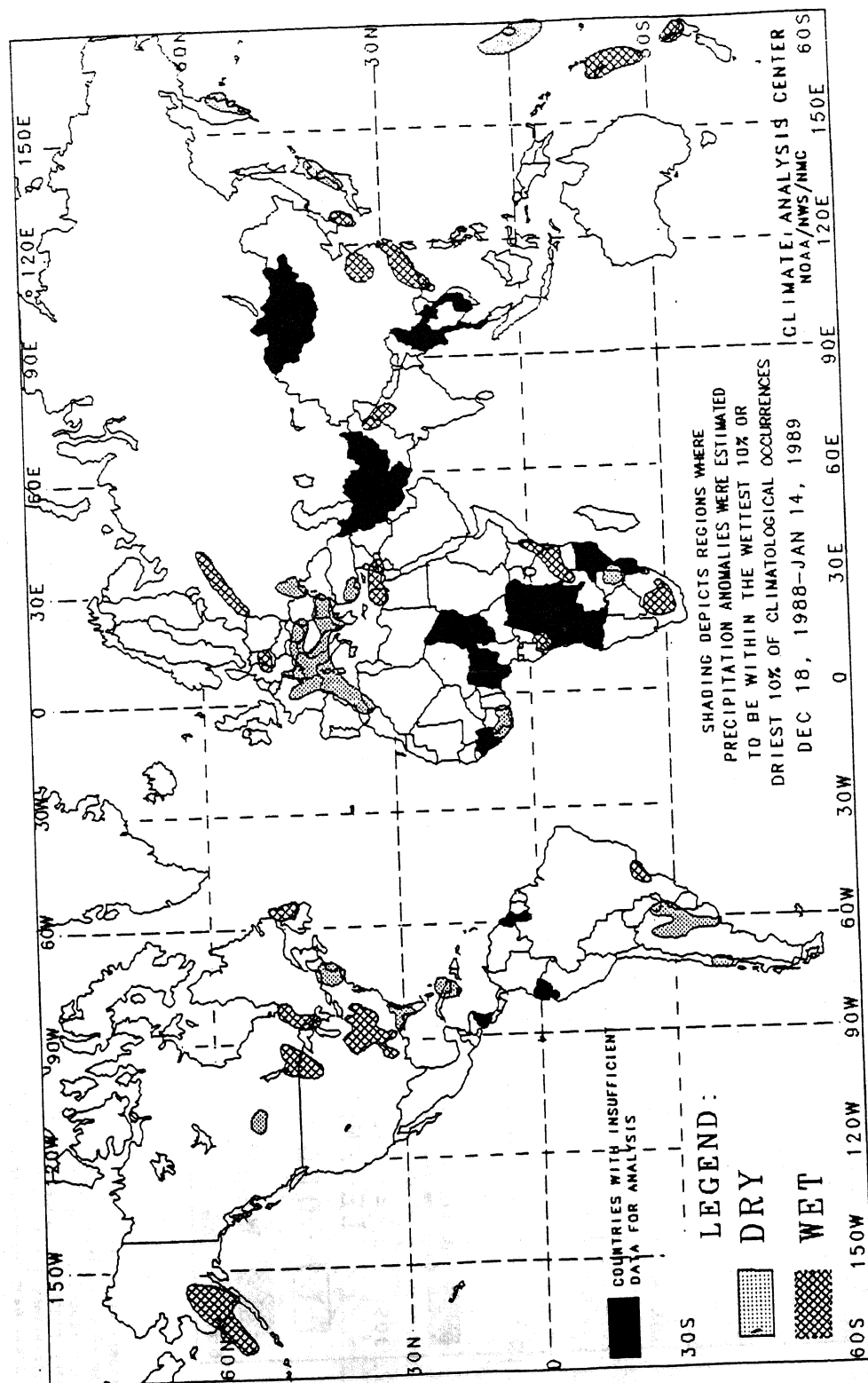
JAN 8-14, 1989





# GLOBAL PRECIPITATION ANOMALIES

4 WEEKS



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data is insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

# SPECIAL CLIMATE SUMMARY

CLIMATE ANALYSIS CENTER, NMC  
NATIONAL WEATHER SERVICE, NOAA

## MAJOR CLIMATIC EVENTS AND ANOMALIES IN THE UNITED STATES DURING 1988

### 1. Central States:

#### DRIEST IN 58 YEARS.

The Drought of 1988 was the most severe in the Midwest since 1936. Extensive areas of the Mississippi, Ohio, and Tennessee Valleys endured the driest April through June in 58 years. Other regions were also affected and included portions of the northern Rockies, the northern Great Plains, the eastern Gulf Coast, and the Appalachians. Precipitation deficits for the three months (April-June) exceeded six inches in the lower and middle Mississippi Valleys. The drought peaked in early July as welcome rains fell during late July and August and improved short-term moisture conditions. Long-term precipitation deficits, however, remained and affected reservoir and riverflow conditions [see Figure 1].

### 2. North-Central States:

#### RECORD HEAT AGGRAVATES DROUGHT.

Several short-term heat waves resulted in the hottest summer (June-August) in at least the last 38 years (1951-1988) from Wyoming eastward to Wisconsin. Temperatures averaged 4°F above normal for the entire summer. Hundreds of maximum temperature records fell as practically all of the United States experienced at least 20 days with highs of 90°F or more. The north-central states endured 40 to 60 days of temperatures reaching 90°F or above, which is at least 20 days more than normally expected. In late August, cool Canadian air invaded the region and brought welcome relief [see Figure 3].

### 3. The Pacific Coast:

#### RAINY SEASON ENDS WITH LARGE PRECIPITATION DEFICITS.

The rainy season in the Far West normally reaches its maximum during the winter months (December-February). Many parts of the Pacific Coast received less than three-fourths of their expected rainfall between October 1987 and April 1988. Precipitation in January, February, and March was well below normal but late season storms in Washington and Oregon ended the dry spell by April. California experienced heavy rains in late April. Almost the entire region entered the Summer with substantial precipitation deficits [see Figure 1].

### 4. The Southeast:

#### UNUSUALLY DRY FEBRUARY THROUGH APRIL.

Less than half the expected rainfall occurred in the southeastern United States in February and March and precipitation deficits reached four to eight inches. Precipitation generally increased across most of the area by the middle of April. Short-term moisture conditions improved, and above normal precipitation during the latter half of the year greatly reduced long-term moisture deficits [see Figure 1].

### 5. The Southwest:

#### WARM SPELL IN OCTOBER AND EARLY NOVEMBER.

Unusually high temperatures occurred in the southwestern United States during October and November. Record-breaking daily maximum temperatures were reported in early November but cooler air moved into the region around the middle of the month [see Figure 3].

6. Mississippi and Tennessee River Valleys:

STORM SYSTEMS PRODUCE HEAVY RAINS.

Heavy precipitation was recorded throughout most of the Mississippi and Tennessee Valleys as several storm systems passed through the area in November. Torrential rainfall, nearly 15 inches in central Arkansas, provided significant relief from earlier dry conditions (see items 1 and 4 above) [see Figure 2].

7. The Midwest:

OCTOBER UNUSUALLY COLD.

A series of early season arctic air masses brought unseasonably cold weather to the Midwest in October and early November. Several new daily minimum temperature records were set during the first week of November [see Figure 4].

8. The West:

HEAT WAVE LATE AUGUST AND EARLY SEPTEMBER.

Highs surpassing the century mark occurred from Arizona and southern California northward into Canada (116°F at Redding, CA). The four weeks of hot weather ended in the middle of September when cooler Canadian air infiltrated the Rockies [see Figure 3].

9. Continental United States:

EARLY JANUARY COLD SNAP.

Bitterly cold arctic air invaded the United States in early January and covered the entire nation from the Rockies eastward to the Atlantic Coast. A snow storm left over a foot of snow in Oklahoma City. Temperatures moderated during the third week of the month [see Figure 4].

10. The Northeast:

LATE SPRING COLD SPELL.

Very cold Canadian air invaded the northeastern United States and penetrated as far south as Kentucky and Virginia. Many low daily minimum temperature records were set at the end of April and the beginning of May [see Figure 4].

11. South-Central and Southeastern States:

HEAVY RAIN, SNOW IN JANUARY.

Excessive precipitation was reported across the region in early January. Heavy snow, up to a foot, was reported in parts of Oklahoma, Arkansas, Missouri, Tennessee, Alabama, the Carolinas, Virginia, Maryland, and the District of Columbia. Sleet and freezing rain glazed areas farther south [see Figure 2].

12. Hawaii:

TORRENTIAL RAINS IN OAHU.

Very heavy rains, up to 20 inches in the Koolau Mountains, fell on Oahu at the beginning of the year. Severe flooding was reported on the eastern half of the island [see Figure 2].

13. Central and Eastern States:

COLD WAVE IN LATE JANUARY, EARLY FEBRUARY.

Arctic air spread across the eastern two-thirds of the United States. The coldest weather occurred in the northern Plains and upper Midwest where minimum temperatures fell below -20°F. Freezing temperatures penetrated as far south as the Gulf of Mexico and central Florida [see Figure 4].

14. The Northeast:

MID-DECEMBER COLD SNAP.

Frigid arctic air invaded the northeastern United States during the second week of December. Many stations were as much as 15°F below normal and several new daily minimum temperature records were tied or set. By late December unseasonably mild air ended the cold spell [see Figure 4].

# SIGNIFICANT BELOW NORMAL PRECIPITATION ANOMALIES

DURING 1988

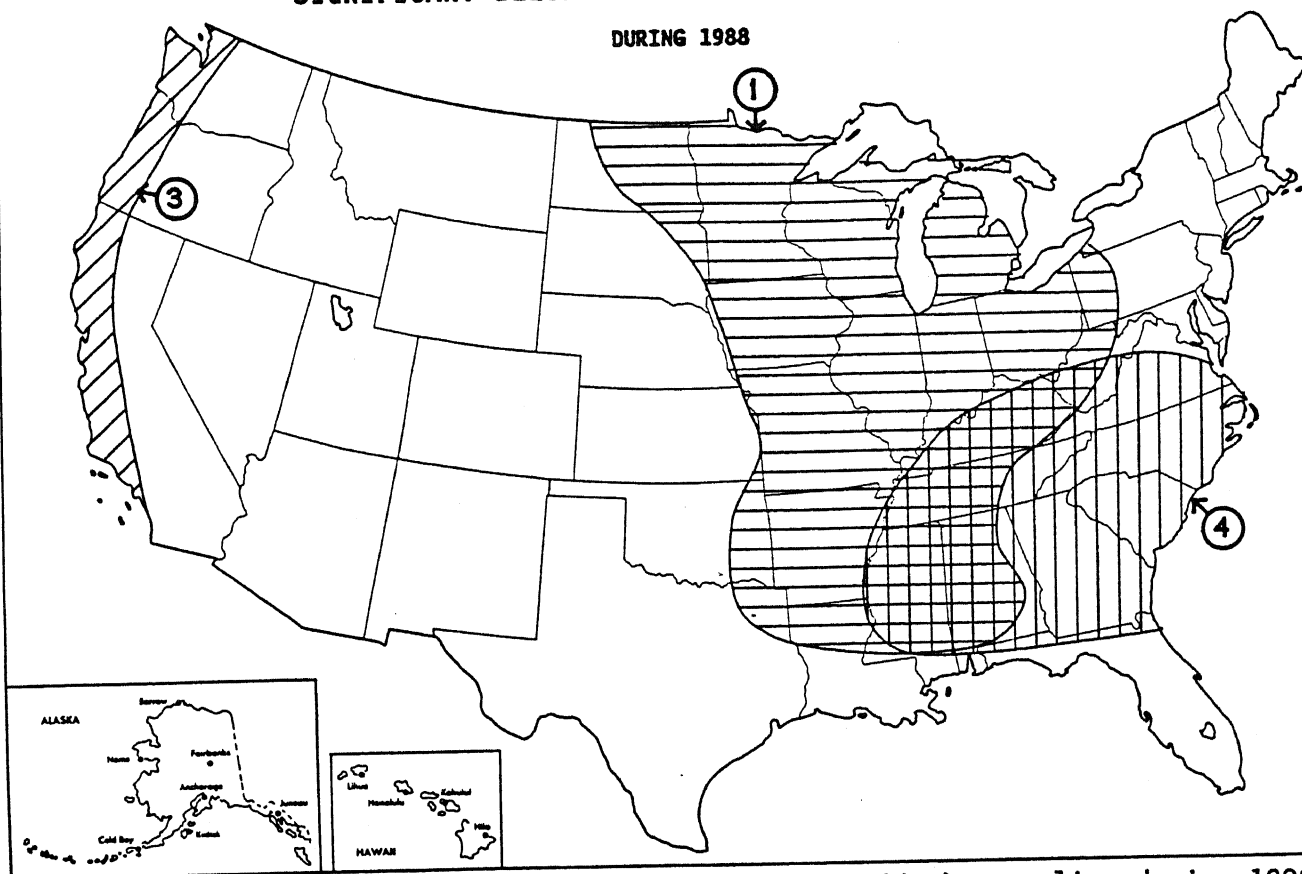


Figure 1. Significant below normal precipitation (dry) anomalies during 1988.

# SIGNIFICANT ABOVE NORMAL PRECIPITATION ANOMALIES

DURING 1988

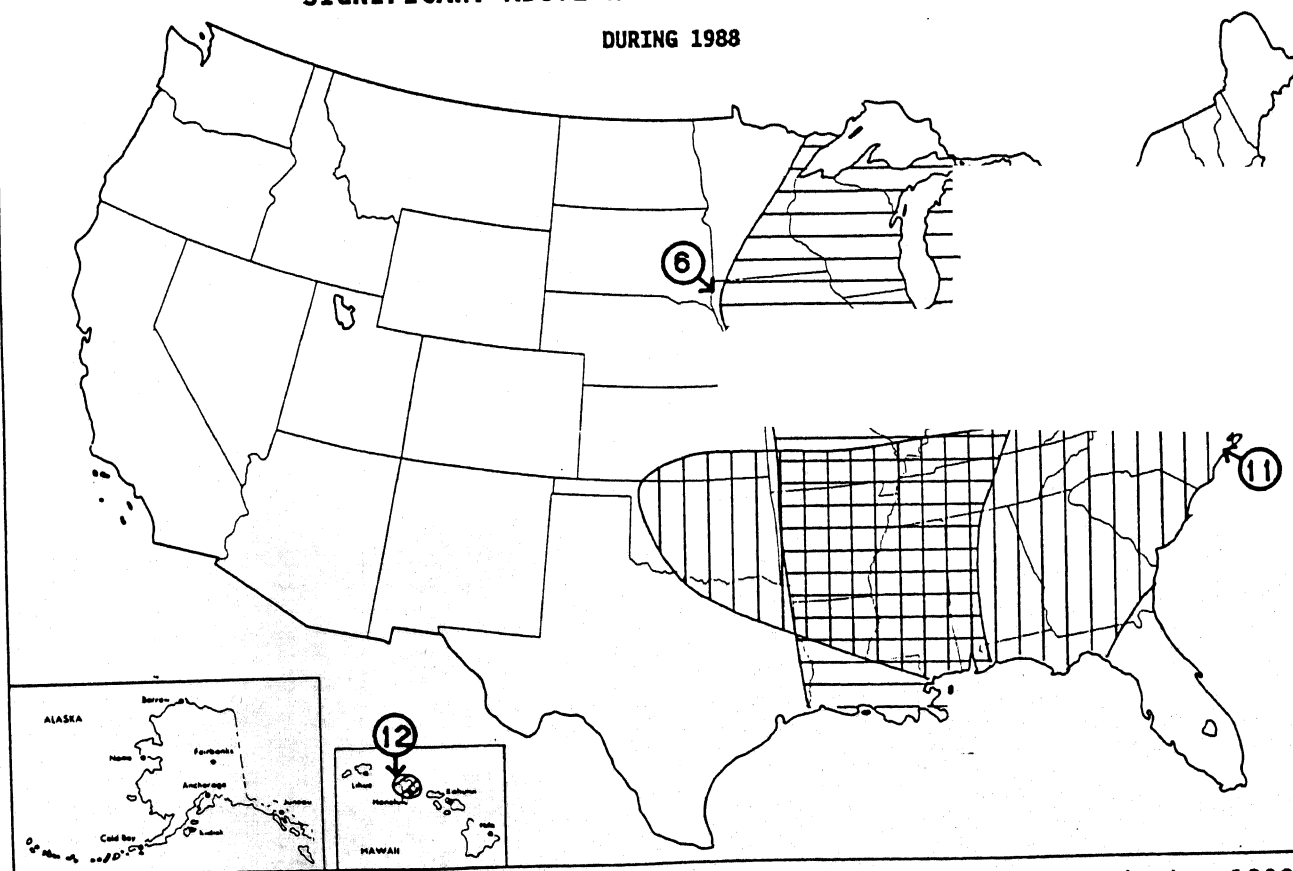


Figure 2. Significant above normal precipitation (wet) anomalies during 1988.

# SIGNIFICANT ABOVE NORMAL TEMPERATURE ANOMALIES

DURING 1988

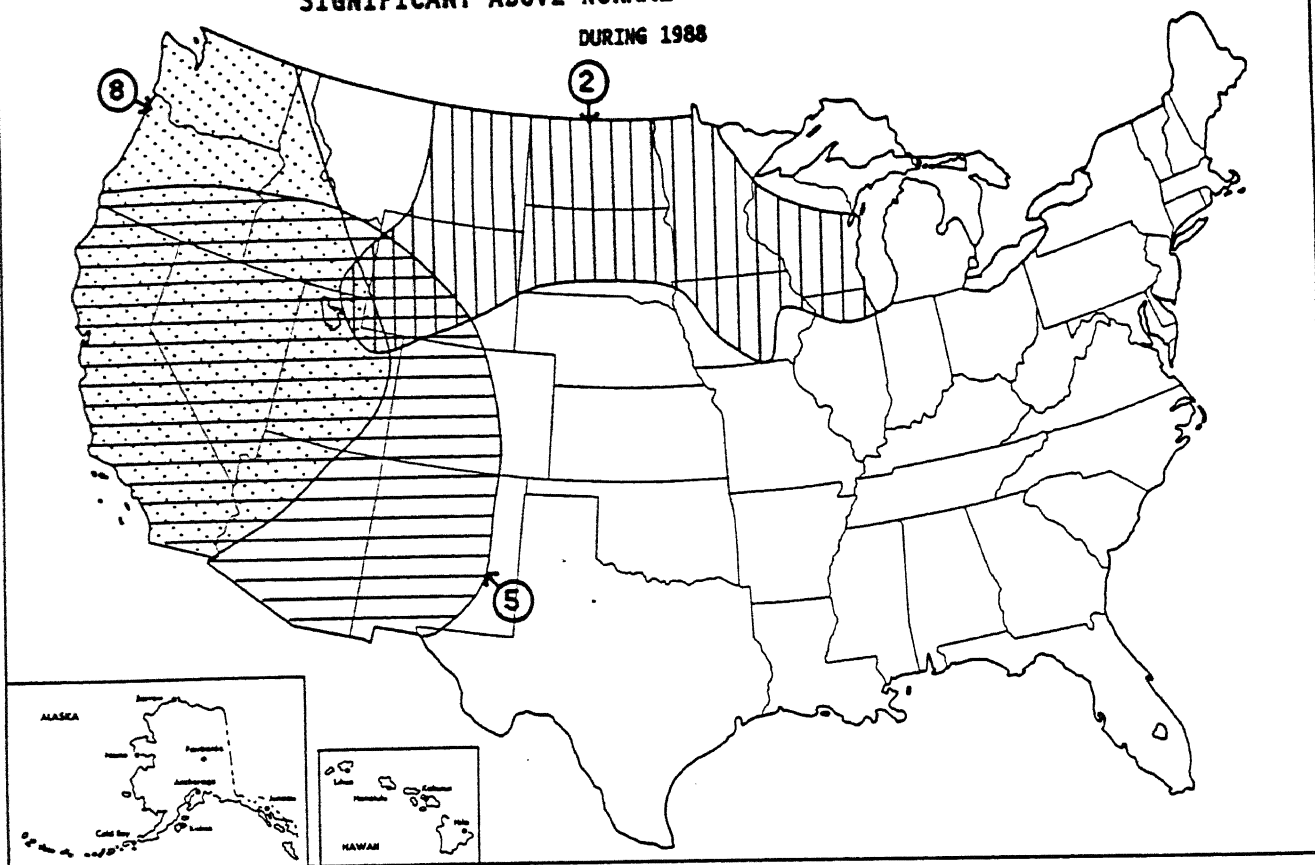


Figure 3. Significant above normal temperature (warm) anomalies during 1988.

# SIGNIFICANT BELOW NORMAL TEMPERATURE ANOMALIES

DURING 1988

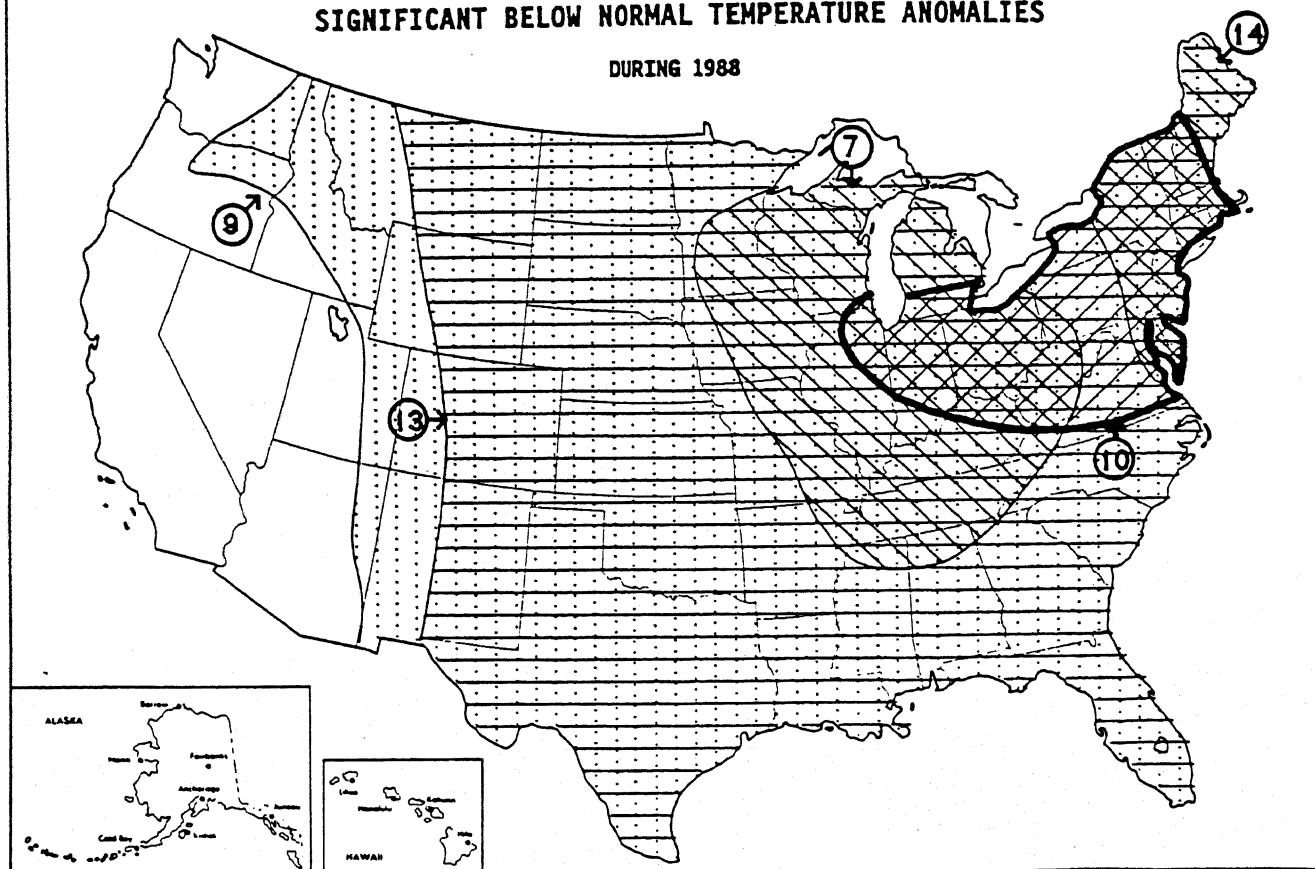
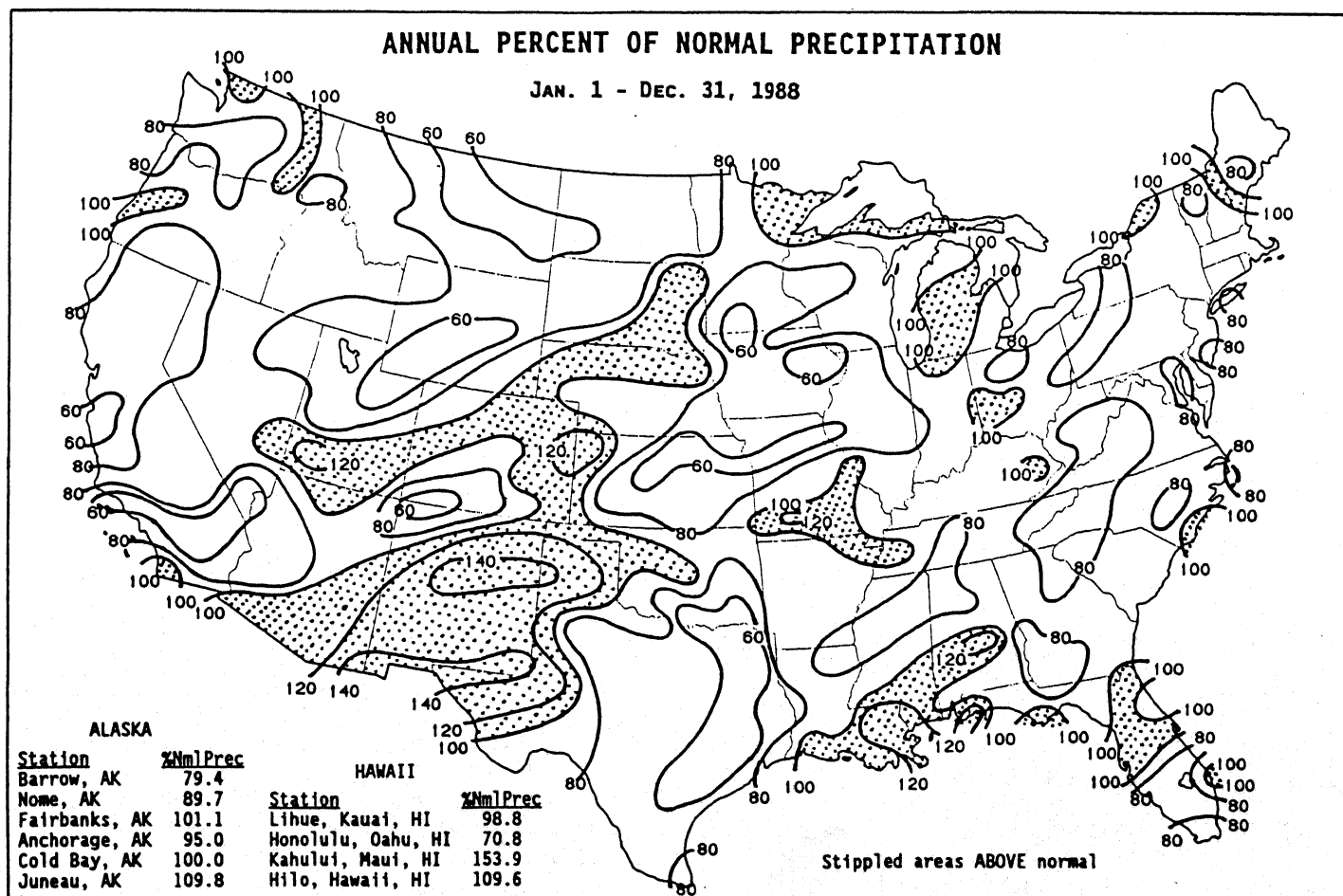
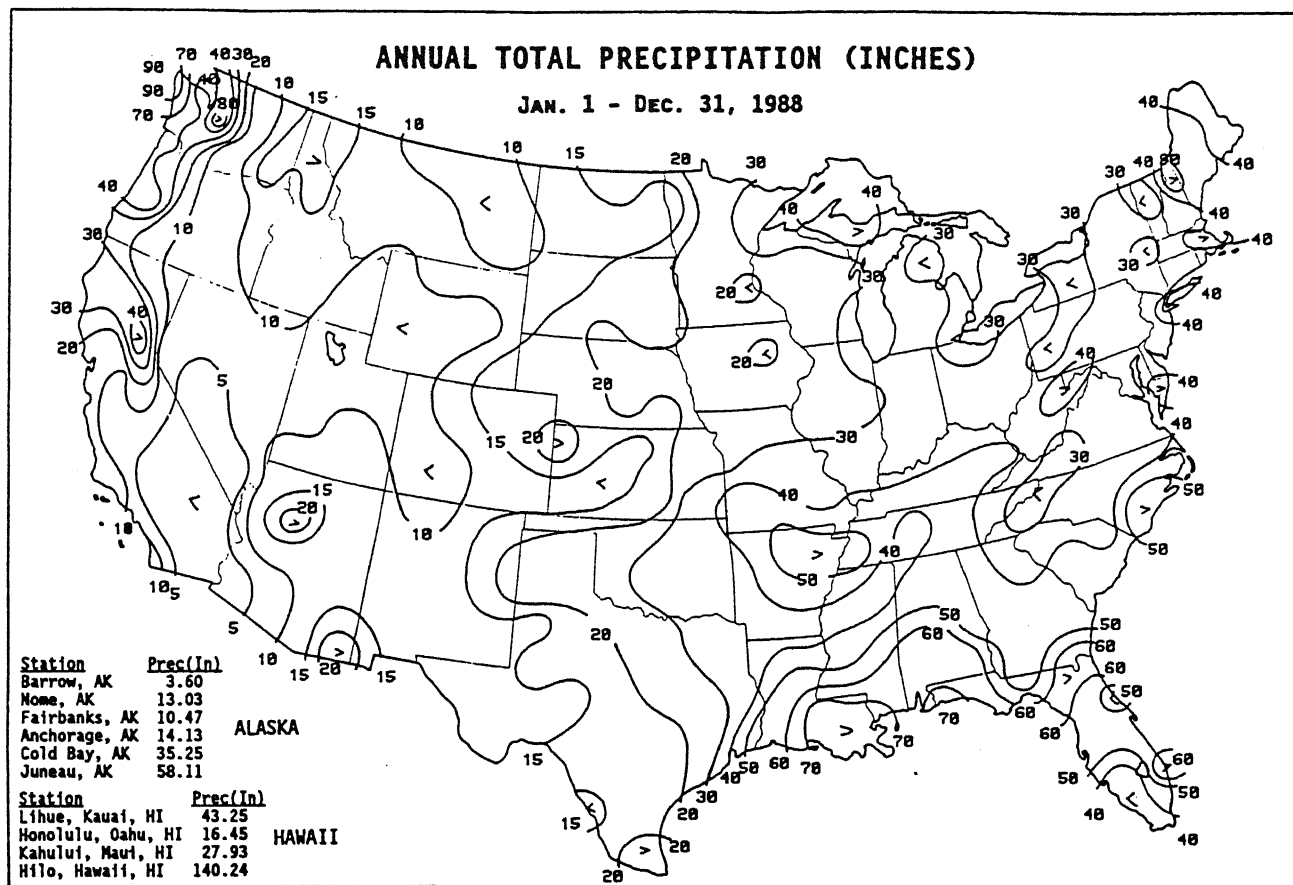


Figure 4. Significant below normal temperature (cold) anomalies during 1988.



# ANNUAL DEPARTURE FROM NORMAL PRECIPITATION (INCHES)

JAN. 1 - DEC. 31, 1988

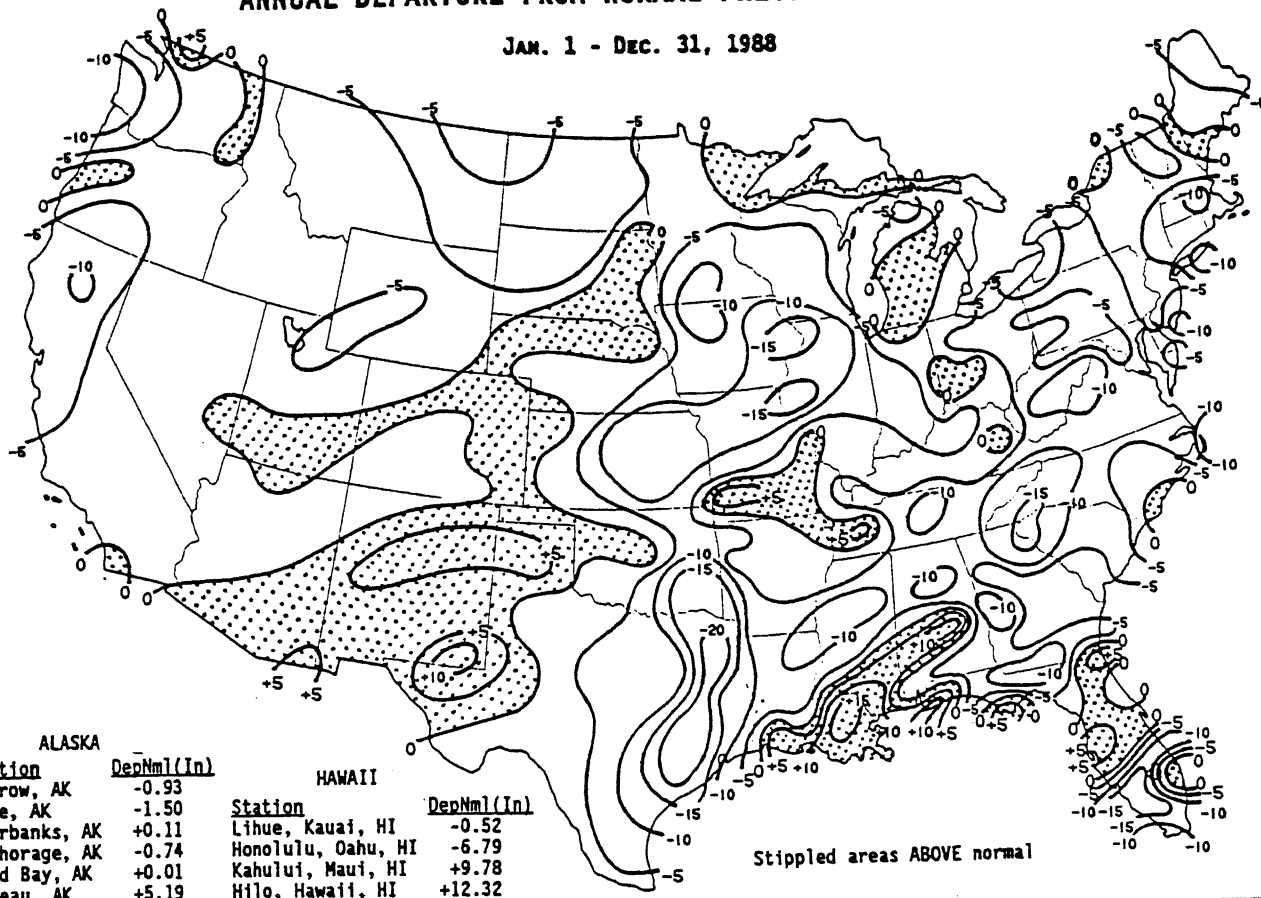


TABLE 1. SELECTED STATIONS THAT WERE ABNORMALLY WET AND/OR RECORDED HEAVY PRECIPITATION AMOUNTS DURING 1988.

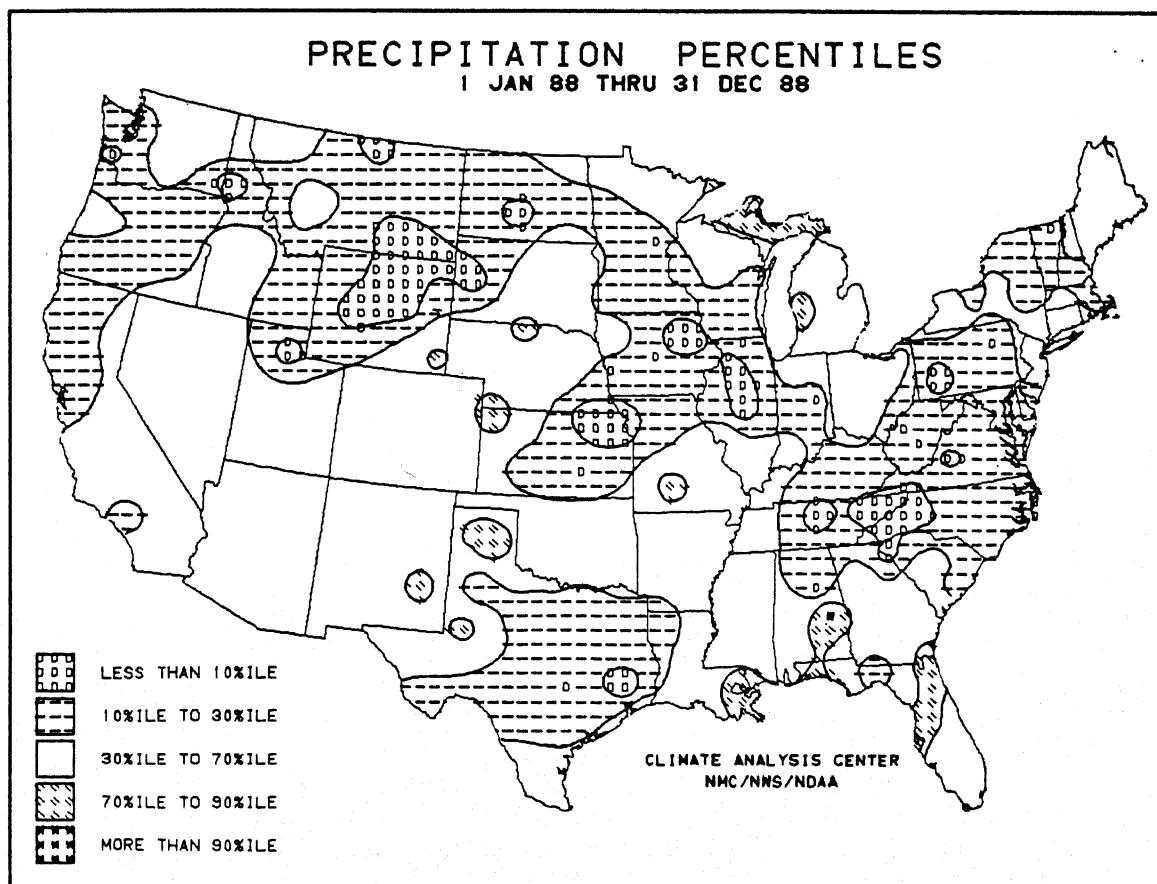
(Percent of normal precipitation more than 125%; OR, total precipitation more than 50 inches AND no normals).

| Station                     | Amt(In) | %Norm | Station             | Amt(In) | %Norm |
|-----------------------------|---------|-------|---------------------|---------|-------|
| Yakutat, AK                 | 200.70  | 148.7 | Little Rock AFB, AR | 50.52   | ***   |
| Kokee, Kauai, HI            | 90.94   | 142.6 | Columbus AFB, MS    | 50.47   | ***   |
| Valdez, AK                  | 88.48   | 148.3 | Meridian NAS, MS    | 50.14   | ***   |
| Kodiak, AK                  | 84.41   | 139.1 | Homer, AK           | 32.44   | 136.0 |
| Baton Rouge, LA             | 76.03   | 136.3 | Kahului, Maui, HI   | 27.93   | 153.9 |
| McComb, MS                  | 74.42   | ***   | Amarillo, TX        | 24.72   | 131.0 |
| Homestead AFB, FL           | 70.94   | ***   | Carlsbad, NM        | 22.20   | 208.2 |
| Milton/Whiting NAS, FL      | 68.43   | ***   | Goodland, KS        | 20.86   | 129.8 |
| New Orleans/Lake Front, LA  | 67.57   | ***   | Tucumcari, NM       | 19.90   | 148.5 |
| Montgomery, AL              | 65.58   | 134.0 | Midland, TX         | 18.27   | 135.4 |
| New Orleans NAS, LA         | 63.37   | ***   | Douglas, AZ         | 17.14   | 140.9 |
| Panama City/Tyndall AFB, FL | 59.98   | ***   | Roswell, NM         | 13.73   | 128.8 |
| Memphis NAS, TN             | 56.67   | ***   | Albuquerque, NM     | 13.13   | 166.2 |
| Ozark/Cairns AFB, AL        | 55.03   | ***   | Deming, NM          | 12.01   | 128.3 |
| Tampa/Mac Dill AFB, FL      | 54.06   | ***   | El Paso, TX         | 11.06   | 145.3 |
| Cherry Point MCAS, NC       | 52.25   | ***   | Kotzebue, AK        | 10.83   | 126.8 |
| Pensacola NAS, FL           | 52.14   | ***   |                     |         |       |

(Note: Asterisks indicate station has no normals).

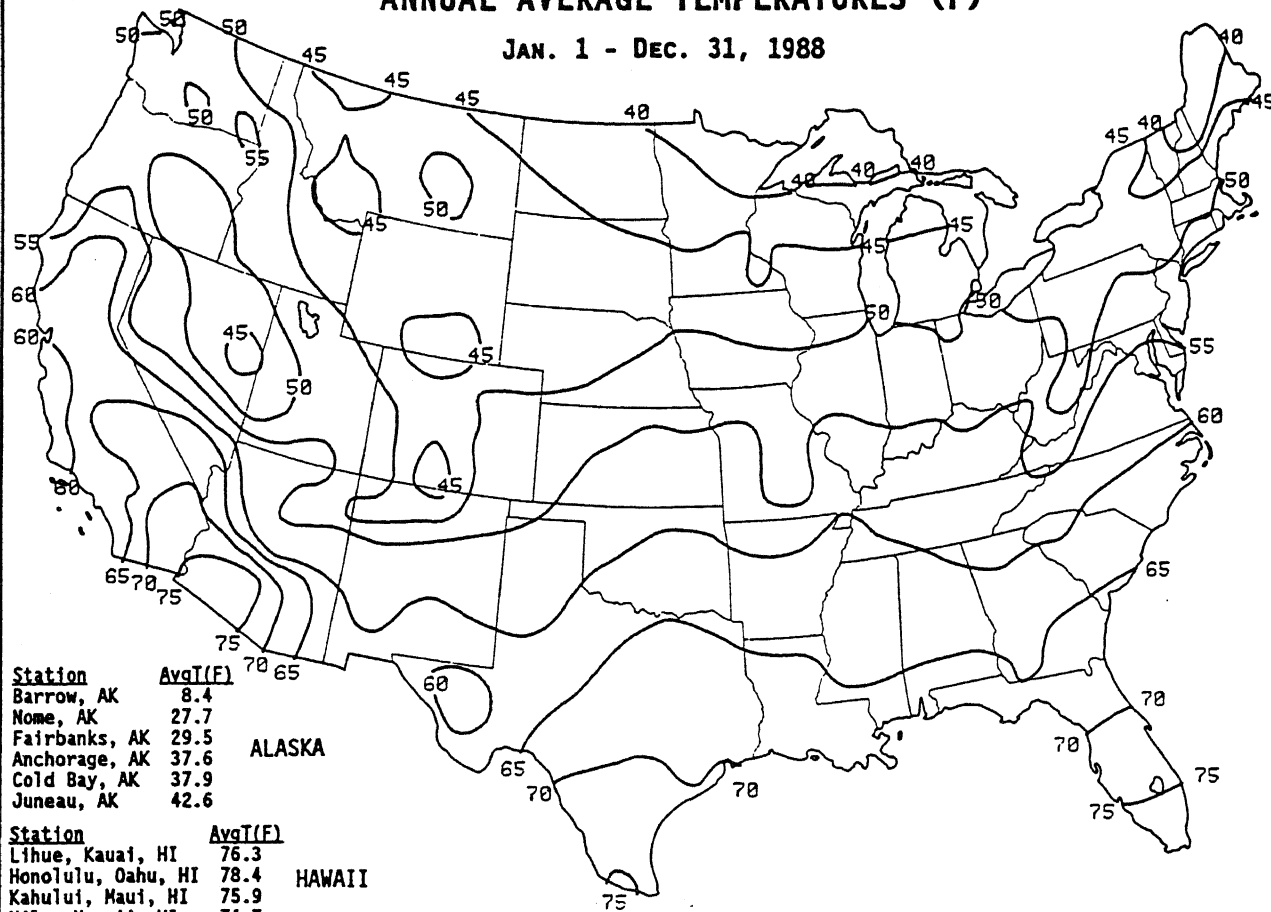
TABLE 2. SELECTED STATIONS THAT WERE ABNORMALLY DRY DURING 1988.  
(Normal precipitation more than 30 inches AND percent of normal precipitation 75% or less).

| Station             | %Nml | Inches |       | Station               | %Nml | Inches |       |
|---------------------|------|--------|-------|-----------------------|------|--------|-------|
|                     |      | Amt    | Nml   |                       |      | Amt    | Nml   |
| College Station, TX | 39.9 | 15.59  | 39.07 | Kansas City/Intl., MO | 67.2 | 24.22  | 36.07 |
| Victoria, TX        | 43.1 | 15.91  | 36.90 | Rockford, IL          | 67.8 | 24.77  | 36.55 |
| Houston, TX         | 49.5 | 22.90  | 46.29 | Lufkin, TX            | 69.1 | 28.65  | 41.49 |
| Longview, TX        | 51.6 | 23.96  | 46.46 | Moline, IL            | 69.8 | 25.78  | 36.93 |
| Cedar Rapids, IA    | 54.3 | 19.33  | 35.62 | Elkins, WV            | 69.9 | 30.20  | 43.23 |
| Dubuque, IA         | 56.9 | 21.98  | 38.61 | Seymour-Johnson, NC   | 70.0 | 35.10  | 50.15 |
| Waterloo, IA        | 57.9 | 18.97  | 32.79 | Eau Claire, WI        | 70.1 | 21.24  | 30.31 |
| Topeka, KS          | 58.2 | 19.40  | 33.34 | North Omaha, NE       | 70.7 | 21.34  | 30.17 |
| Asheville, NC       | 60.8 | 26.61  | 43.74 | Findlay, OH           | 71.6 | 23.87  | 33.31 |
| McAlester, OK       | 61.1 | 25.97  | 42.52 | Worcester, MA         | 71.7 | 34.14  | 47.60 |
| Austin, TX          | 61.4 | 19.21  | 31.28 | Des Moines, IA        | 72.0 | 22.04  | 30.59 |
| Corpus Christi, TX  | 62.2 | 19.28  | 30.98 | Bristol, TN           | 73.6 | 30.34  | 41.24 |
| Rumford, ME         | 62.6 | 27.45  | 43.85 | Millville, NJ         | 73.6 | 31.63  | 42.95 |
| Peoria, IL          | 63.5 | 22.16  | 34.91 | Knoxville, TN         | 73.8 | 34.74  | 47.07 |
| Ft. Sill, OK        | 63.6 | 19.76  | 31.07 | Dallas/Love Field, TX | 74.0 | 25.27  | 34.16 |
| Palacios, TX        | 64.1 | 27.95  | 43.61 | Springfield, IL       | 74.2 | 25.29  | 34.08 |
| Ft. Myers, FL       | 64.2 | 34.44  | 53.64 | Charleston, WV        | 74.5 | 31.46  | 42.20 |
| Burlington, IA      | 64.7 | 22.39  | 34.61 | Pittsburgh, PA        | 74.9 | 27.11  | 36.20 |
| Athens, GA          | 64.9 | 32.37  | 49.92 | Patuxent River, MD    | 74.9 | 29.42  | 39.29 |
| Ottumwa, IA         | 65.0 | 21.61  | 33.25 | Islip, NY             | 74.9 | 33.52  | 44.77 |
| Nashville, TN       | 65.0 | 31.38  | 48.24 |                       |      |        |       |



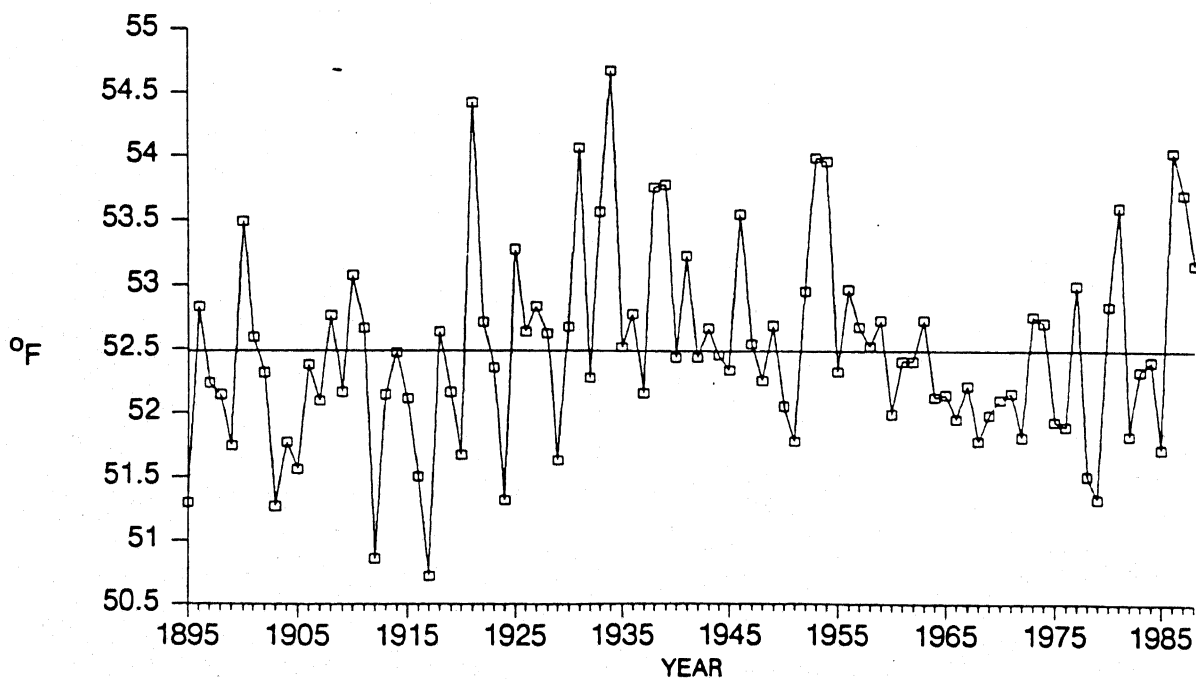
## ANNUAL AVERAGE TEMPERATURES (F)

JAN. 1 - DEC. 31, 1988



## NATIONAL TEMPERATURE

ANNUAL, 1895-1988



National Climatic Data Center, NOAA

# ANNUAL DEPARTURE FROM NORMAL AVERAGE TEMPERATURE (F)

JAN. 1 - DEC. 31, 1988

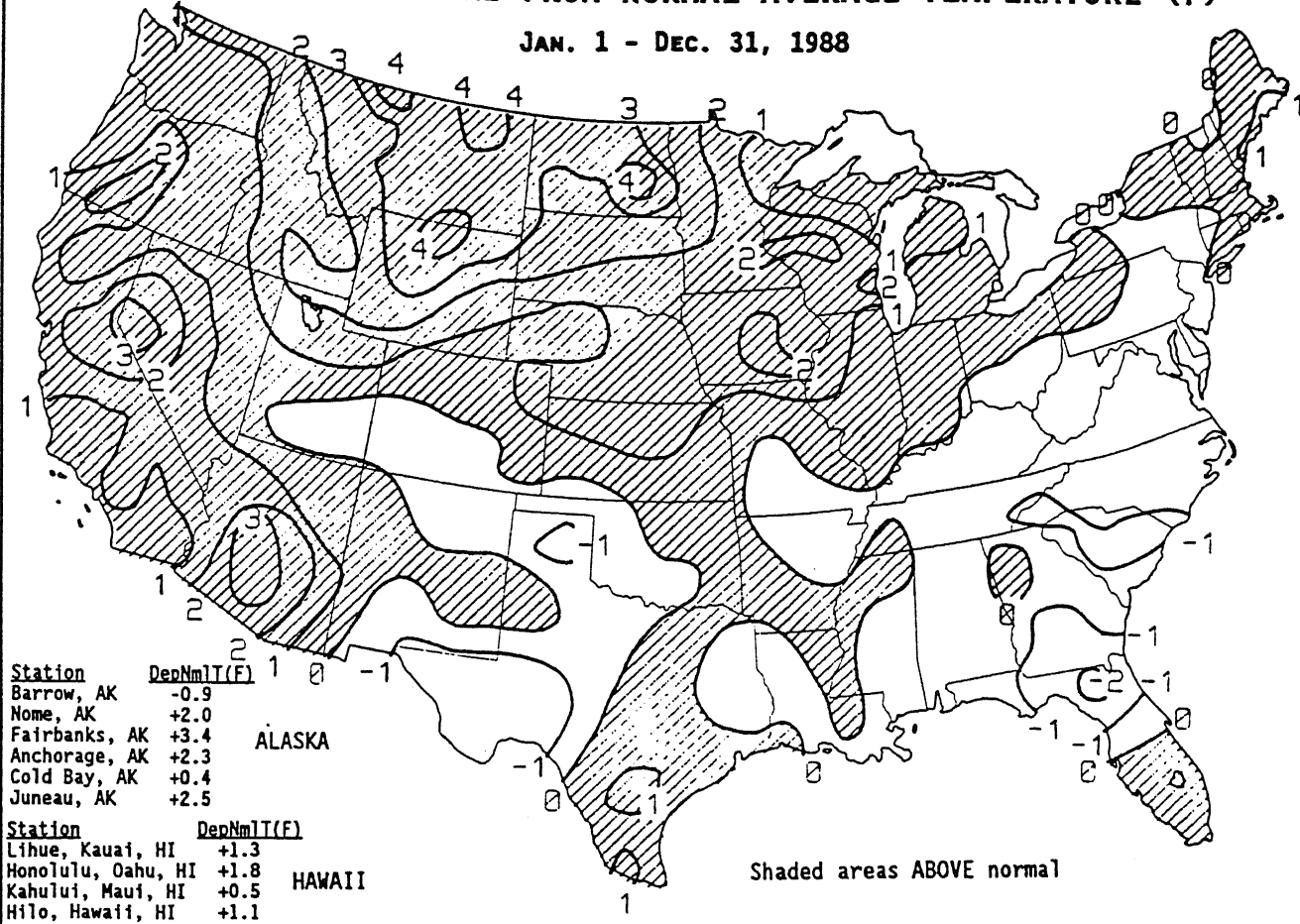


TABLE 3. ANNUAL AVERAGE TEMPERATURE DEPARTURES +3.0°F OR MORE.

| Station                       | Dep(°F) | AvgI(°F) | Station        | Dep(°F) | AvgI(°F) |
|-------------------------------|---------|----------|----------------|---------|----------|
| Phoenix, AZ                   | +4.7    | 76.0     | Minot, ND      | +3.4    | 43.8     |
| Victorville/George AFB, CA    | +4.6    | 64.1     | Fairbanks, AK  | +3.4    | 29.5     |
| Worland, WY                   | +4.5    | 48.7     | Miles City, MT | +3.3    | 48.8     |
| Cut Bank, MT                  | +3.9    | 44.3     | Lander, WY     | +3.3    | 47.8     |
| Glasgow, MT                   | +3.7    | 45.7     | Valdez, AK     | +3.3    | 39.4     |
| Jamestown, ND                 | +3.7    | 44.2     | Helena, MT     | +3.2    | 46.6     |
| San Bernardino/Norton AFB, CA | +3.6    | 66.9     | San Jose, CA   | +3.1    | 62.6     |
| Reno, NV                      | +3.6    | 53.1     | Sitka, AK      | +3.1    | 45.7     |
| Sheridan, WY                  | +3.5    | 48.2     | Lewistown, MT  | +3.1    | 45.1     |
| Kenai, AK                     | +3.5    | 36.7     | Dickinson, ND  | +3.1    | 44.9     |
| Talkeetna, AK                 | +3.5    | 36.3     | Havre, MT      | +3.0    | 46.0     |
| Billings, MT                  | +3.4    | 50.2     | Iliamna, AK    | +3.0    | 36.7     |

TABLE 4. ANNUAL AVERAGE TEMPERATURE DEPARTURES -1.0°F OR LESS.

| Station                 | Dep(°F) | AvgI(°F) | Station                     | Dep(°F) | AvgI(°F) |
|-------------------------|---------|----------|-----------------------------|---------|----------|
| Gainesville, FL         | -2.5    | 67.6     | Poplar Bluff, MO            | -1.3    | 56.8     |
| Fayetteville, NC        | -2.2    | 59.9     | Ft. Sill/Henry Post, OK     | -1.3    | 60.9     |
| Dalhart, TX             | -1.8    | 53.6     | Midland, TX                 | -1.3    | 62.1     |
| Tallahassee, FL         | -1.6    | 65.6     | Wilmington, NC              | -1.3    | 62.2     |
| Jacksonville, FL        | -1.5    | 67.4     | El Paso, TX                 | -1.3    | 62.4     |
| Elkhart, KS             | -1.5    | 55.0     | Macon/Warner-Robins AFB, GA | -1.2    | 64.2     |
| Jonesboro, AR           | -1.5    | 59.7     | San Angelo, TX              | -1.2    | 64.4     |
| Brunswick, GA           | -1.4    | 66.0     | Bowling Green, KY           | -1.1    | 55.9     |
| Poughkeepsie, NY        | -1.3    | 47.8     | Knoxville, TN               | -1.1    | 57.7     |
| Delta, UT               | -1.3    | 49.5     | Greenville, SC              | -1.1    | 59.4     |
| Parkersburg, WV         | -1.3    | 52.9     | Lufkin, TX                  | -1.1    | 65.9     |
| Wrightstown/McGuire, NJ | -1.3    | 53.2     | Atlantic City, NJ           | -1.0    | 52.5     |
| Asheville, NC           | -1.3    | 54.3     | Macon, GA                   | -1.0    | 63.7     |
| Amarillo, TX            | -1.3    | 56.0     |                             |         |          |



## JAN. 1 - DEC. 31, 1988



